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NEW YORK (STATE). DIVISION OF MATERNAL AND CHILD  
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# BUILDING AND MAINTAINING SOUND TEETH



*New York (State)*

DIVISION OF MATERNAL AND CHILD HEALTH  
NEW YORK STATE DEPARTMENT OF HEALTH

EDWARD S. GODFREY, JR., M. D. Commissioner

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# HOW TO BUILD AND MAINTAIN HEALTHY TEETH

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For many years both the medical and dental professions have recognized the seriousness of dental disease. Statistics show that from 90 to 95 per cent of all children entering school have one or more decayed teeth. Such teeth may affect very seriously the general well-being of the child.

It has been said that pain is man's best friend, because it gives him the signal to correct some irregularity in his system. If every tooth with a small cavity were to ache, many teeth which are now being lost could be saved, and much suffering would be avoided. Unfortunately, the majority of defective teeth do not ache until considerable damage has been done. It is not uncommon to X-ray a person's teeth and find an abscessed tooth which has never ached or caused any trouble of which he was aware. Yet that abscess may be sending its army of germs and resultant poisons to other parts of the body, thus acting as a focus of infection or a starting point from which other organs and tissues may be affected.

From the standpoint of economy it is far preferable to fill cavities in their early stages than to permit them to progress to the point where they require extensive treatment, or extraction and replacement with artificial teeth. The small cost of periodic examination of the teeth for defects and the immediate correction of any beginning cavities, may be compared to the cost of an insurance policy against the future need for artificial teeth and the discomfort and expense that go with them.

The best weapon with which to fight dental decay is EDUCATION. If the message, "How to Build and Maintain Healthy Teeth," reaches a sufficiently large number of people who will follow the simple rules set down, many in the succeeding generation will not have to suffer the discomforts and the health hazards which their parents endure today.

The hope for future dental health of the people is based on success in educating the parents of present-day children who in turn will be the parents of the following generation. In order to help children to have a full set of teeth when they grow to adulthood, it is necessary to start in early childhood. Through proper diet and nutrition, good daily mouth care, and early treatment by the family dentist, it is possible to provide the foundations that go into building sound teeth and the care necessary to keep them in the best condition.

Before going into a discussion of the care of the teeth it is necessary to have some understanding of what teeth look like, what they are made of, and their relationship to the rest of the body.



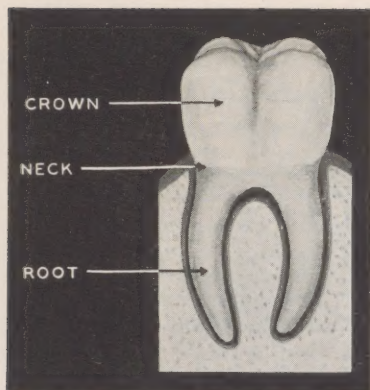


FIGURE 1

Normal molar as it appears in mouth with section of jawbone removed so that roots are exposed.

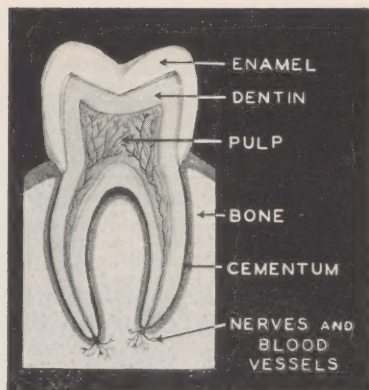


FIGURE 2

Cross-section of lower molar showing the tissues that make up a tooth.

While Figures 1 and 2 are of a molar tooth, all teeth have the same anatomic parts and tissues.

A tooth is a masterpiece of nature—made up of different layers of tissue. This little bit of ivory-like material is intended to withstand a lifetime of grinding, yet not wear out.

A tooth has three distinct parts—(a) the crown, or that portion which is readily visible, (b) the root which is within the bony sockets of the jaw, and which can be seen only by X-ray examination, and (c) the neck, where the crown and roots meet. The crown serves in the cutting and chewing of food, and the root holds the tooth in place.

The outer layer of the crown is made up of a very hard, dense tissue called enamel. Immediately beneath the enamel and running through the crown, the neck, and the root is the dentin, which makes up the bulk of the tooth. Surrounding the entire root of the tooth is bonelike tissue called cementum. In the middle of the tooth is the life-sustaining tissue called the pulp. This is commonly referred to by most people as the nerve, but in reality it contains in addition to nerve tissue, blood vessels which carry the nourishment necessary to keep the tooth alive.

It is this pulp tissue which supplies the connecting link between the tooth and the rest of the body, because the blood vessels and nerves in the tooth are directly continuous with similar vessels and tissues in the surrounding bone. The blood passing through these vessels comes from the same blood stream that supplies the other parts of the body.

This point is emphasized because infection in and around a tooth may be carried through the blood and deposited in some other organ such as the eyes, ears, throat, sinuses, or joints as indicated in Figure 3.

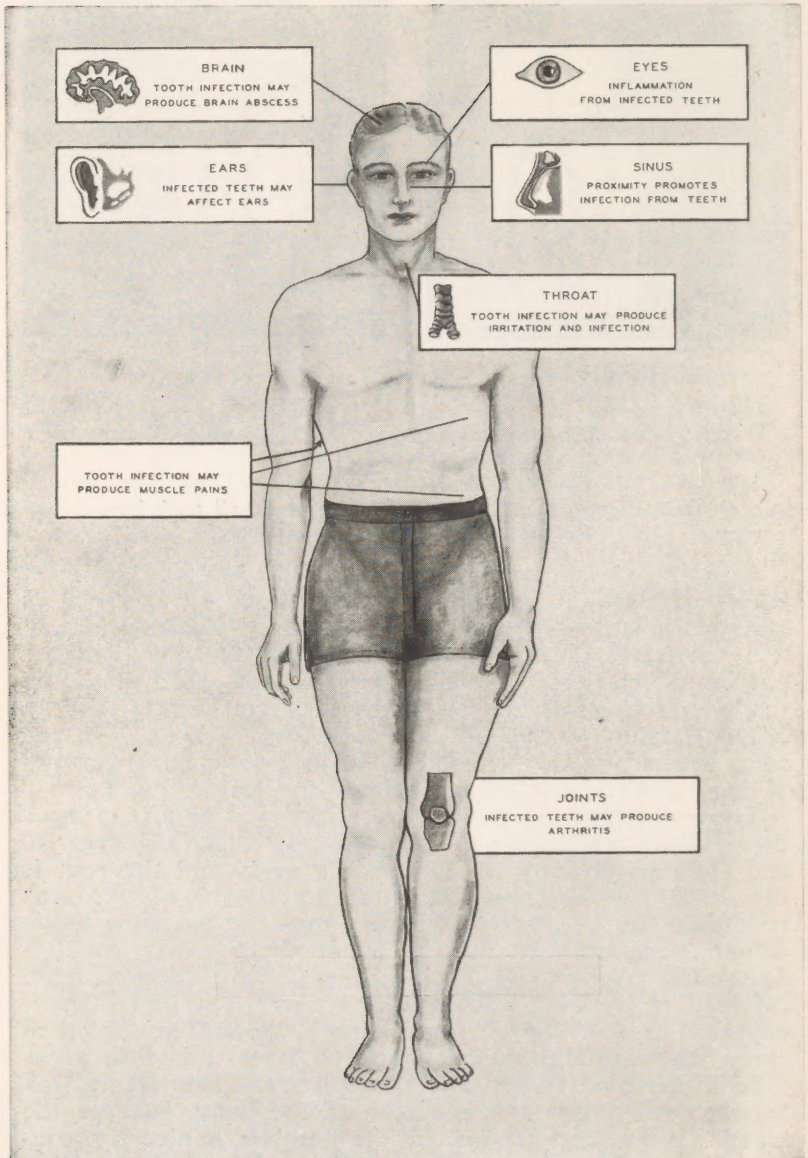


FIGURE 3

Tooth infection may spread to other parts of the body.



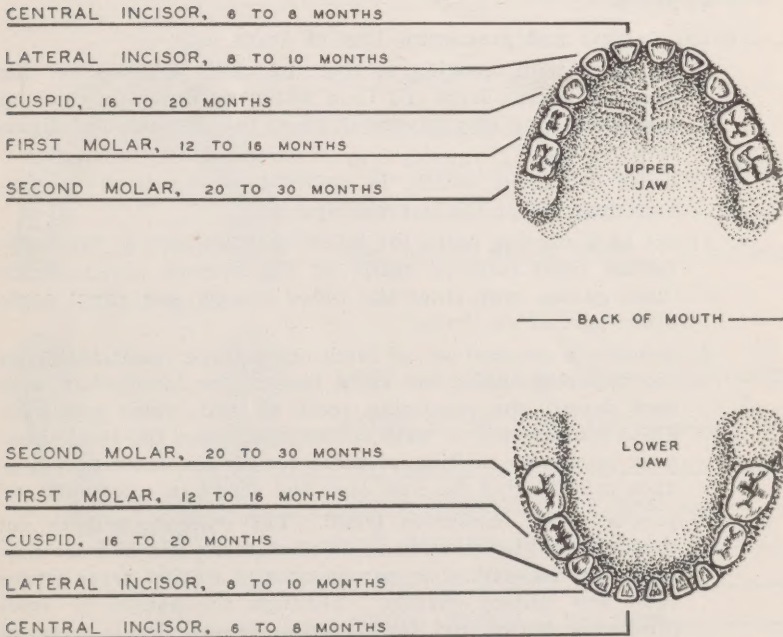
## DEVELOPMENT AND GROWTH OF THE TEETH

As the infant develops, the bones, stomach, liver, kidneys, and other parts of the body grow larger. This is not so with the teeth. When the teeth have completely cut through the gum, they are as large as they ever will be. However, Mother Nature provides two sets of teeth. The first, or deciduous teeth, serve while the jawbones grow and develop. Gradually these baby teeth are replaced by larger ones which form the permanent set and which are expected to last as long as the person lives. That is why they are called permanent teeth.

By the time the child is two and one-half or three years of age, he should have his complete set of temporary or "first" teeth; ten in the upper and ten in the lower jaw.

FIGURE 4

The temporary teeth and the approximate ages at which they appear in the mouth.



More accurately these teeth may be called foundation teeth, because the development and position of the permanent set depend in a large measure on the position of the first teeth. The best development of, and the best use from, the permanent teeth must be the result of properly developed foundation teeth and the performance of the duties for which they are intended.

Frequently a parent is heard to say, "What's the use of filling this baby tooth; it will soon fall out and be replaced by a new one?" That is a sad mistake and dangerous for the child, because it may cause serious trouble later on.

From the table below, it can be seen readily that the foundation teeth are replaced at different ages, and some of them are retained until about the twelfth year.

Neglect of these foundation teeth may cause harmful effects in the growing child, not only in the mouth, but by influencing his development and general well-being.

Temporary central incisor replaced by permanent central incisor  
6-8 years.

Temporary lateral incisor replaced by permanent lateral incisor  
7-9 years.

Temporary first molar replaced by permanent first bicuspid 9-11 years.

Temporary cuspid replaced by permanent cuspid 10-12 years.

Temporary second molar replaced by permanent second bicuspid  
10-12 years.

Dental defects and premature loss of teeth may

- a) interfere with chewing so that the child will not get the greatest benefit from the food which he eats. Swallowing unchewed food may adversely affect the stomach and digestive system.
- b) cause toothache which, in addition to the local discomfort, may affect the nervous system.
- c) act as a starting point for infection elsewhere in the body. Germs from infected teeth, or the poisons given off by these germs, may enter the blood stream and affect some other part of the body.
- d) produce a crooked set of teeth or improper relationship of the opposing teeth; too early loss of the foundation teeth may permit the remaining teeth to shift their positions. Since the first set of teeth act as pathfinders for the permanent teeth, any shifting of these foundation teeth may produce crowding of the new ones and result in a crooked set.
- e) produce food impaction areas. The permanent teeth cut through the gum next to foundation teeth and if these first teeth are decayed, it is not uncommon to find areas where food can collect readily. Through the action of acid-producing germs and fermentation of this food, areas of decay may appear in the new, permanent teeth.



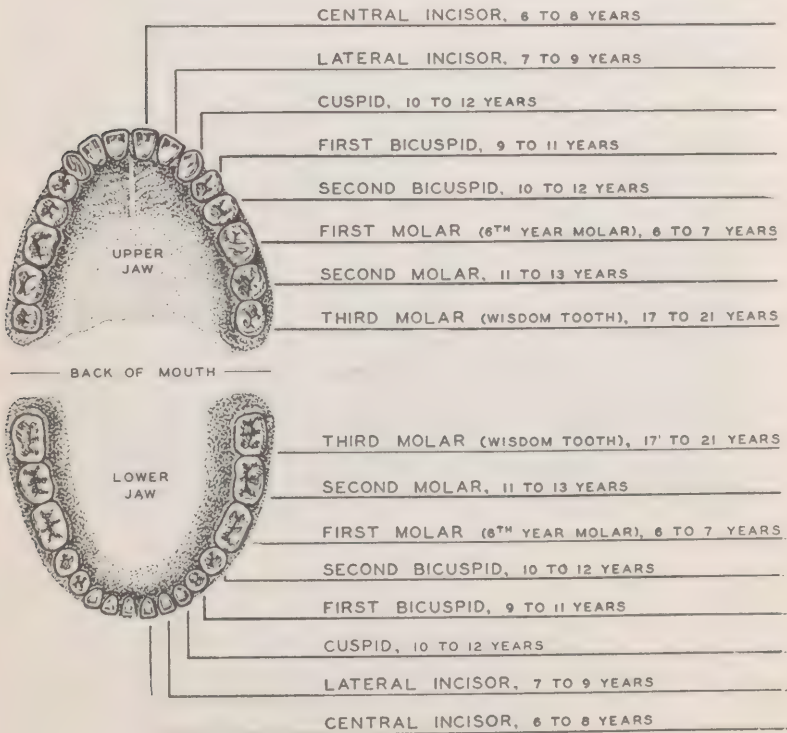
## THE PERMANENT TEETH

Most of the permanent teeth replace baby or foundation teeth when they cut through the gums. The permanent molars, however, do not replace any baby teeth. The full permanent set is comprised of thirty-two teeth whereas the foundation set numbers only twenty. As the child develops, his jawbones grow and make room for the greater number of larger teeth. The permanent set is not complete until after the childhood stage.

As the jaw continues to grow and expand, the additional twelve teeth cut through the gums and take their places behind the last molar tooth. Four (two above and two below) come through the gum when the child is about six years of age, four more about twelve years of age, and the remaining four after seventeen years of age.

FIGURE 5

The permanent teeth and the approximate ages at which they appear in the mouth.



## THE FIRST PERMANENT MOLAR

### (Six Year Molar)

The first permanent tooth cuts through the gum when the child is about six years of age and is often referred to as the "SIX YEAR MOLAR." It is frequently mistaken by parents for one of the first set, and neglected because it is thought that it will be replaced. This tooth may be located by noting the middle line between the two front teeth and counting the teeth back to number six.

The first permanent molars are sometimes called the key-stones to the dental arch because they act as guides for all of the new teeth. The premature loss of the foundation teeth may permit these guides to shift their positions so that there will not be sufficient room for the new teeth to come through. This may cause crowding and improper alignment resulting in a crooked set of teeth.

The six year molars start to develop some time between the last month of pregnancy and six weeks after birth. They continue to grow in the jawbones for about six years and then push their way through the gum behind the last baby tooth on each side.

All teeth may be influenced by the various conditions which have a bearing on the health and development of the infant and growing child. An insufficient or unsatisfactory diet, or prolonged or acute illness during the early years of life, may prevent proper calcification of the teeth. Interference with proper calcification leaves the teeth open to attack by any of the conditions responsible for tooth decay. Because the SIX YEAR MOLAR may be influenced by so many factors, it frequently comes through the gum with some enamel defects, and unless these tiny defects are corrected at an early age, decay may set in and progress rapidly. That is the reason for stressing the importance of early care and treatment of all of the teeth, with special emphasis on the FIRST PERMANENT MOLAR.





FIGURE 6

Cross-section of the right side of the lower jaw of a six-year old child. Note that five of the permanent teeth are developing below foundation teeth and will eventually take their place. Tooth A, the FIRST PERMANENT MOLAR, erupts at about six years of age and DOES NOT REPLACE any foundation tooth. Tooth B, the SECOND PERMANENT MOLAR, erupts at about twelve years of age and DOES NOT REPLACE any foundation tooth.

## BUILDING SOUND TEETH

Since it is believed that food and nutrition play a very important part in the proper development of teeth, it is necessary for the expectant mother to eat the kind of food which will supply the materials of which teeth are made. Otherwise, the developing baby will get some of these substances at the expense of the mother's body, withdrawing them from her long bones. The hard material which makes up such a large part of the teeth is a mineral called calcium, combined chiefly with another mineral, phosphorus. Milk contains more calcium at less cost than any other known food, and it also supplies phosphorus in the right proportion to combine well with calcium to make teeth. The various kinds of cheese contain the same minerals as milk. Therefore, when sufficient milk or cheese is used enough of these minerals will be present in the diet.

However, teeth require more than minerals. They need vitamins also, just as a garment needs thread to hold it together. Vitamin D, found in fish-liver oils; vitamin A, found in cream cheese, butter, yellow and green vegetables; and vitamin C, found in oranges and other citrus fruits or tomatoes, are essential for the health of teeth and gums.

Breast milk is the best possible foundation for sound teeth as well as for the general good health of the baby; but the nursing mother must include extra amounts of minerals and vitamins in her diet in order to protect her own body and supply what her baby needs as well.

As the baby grows older and partakes of solid food, it is still necessary to provide minerals and vitamins. Remember that the foods which promote general good health are those which help to build sound teeth.

Throughout the growth period, the safest rule is to see that one quart of milk a day is consumed by the child. Part of this may be used as a drink and the remainder in puddings, soups, on cereals, or in other milk dishes.

In addition to this, green leafy and yellow vegetables, fruits or fruit juices, both raw and cooked dark or whole-grained cereals, and the yolks of eggs should be the basic foods from which the child's diet is chosen.

Exposure of the body to sunlight or tanning helps greatly in obtaining the most benefit from these foods. During the winter months, when sufficient exposure to the sun's rays is not possible, a similar effect may be secured by using fish-liver oils as directed by a physician.



## DENTAL DECAY (CARIES)

While many theories concerning the causes of dental decay have been advanced, none has been proved so conclusively as to warrant its acceptance as fact. Most dentists today believe that dental decay is produced not by any single factor but rather by a combination of factors.

The most acceptable theory is concerned with the number of acid-producing germs which increase in the presence of starches and sugars, cause fermentation, and produce lactic acid. This acid dissolves the minerals in the enamel, thus starting a cavity.

Through many quite convincing experiments, Doctor Bunting and his colleagues at the University of Michigan have shown that excessive amounts of sugars in the diet tend to increase the number of acid-producing germs in most cases. These experiments demonstrated that by decreasing the amount of sugar intake there was almost complete absence of acid-producing germs, and it was possible to stop carious processes already present and to prevent new cavities. When the sugar intake was increased, the number of acid-producing germs rose alarmingly and many new cavities were started in what apparently was a caries-free or caries-arrested mouth.

It seems advisable, therefore, to use as little sugar as possible in seasoning foods and to cut down considerably on the amount of candy eaten, especially the hard candies which require sucking and are kept in the mouth for prolonged periods of time.

## TOOTH BRUSHING

It must be remembered that the toothbrush and dentifrice are intended for the sole purposes of cleansing the teeth and stimulating the surrounding tissues. Do not be misled into thinking that any particular toothpaste, powder, or mouth wash will cure dental disease. A cleansing bath is not a cure for any skin disease; and tooth or mouth cleansing will not serve to cure dental disease.

The proper type of brush should have a small head. It should have two rows of well-spaced hard or stiff bristles

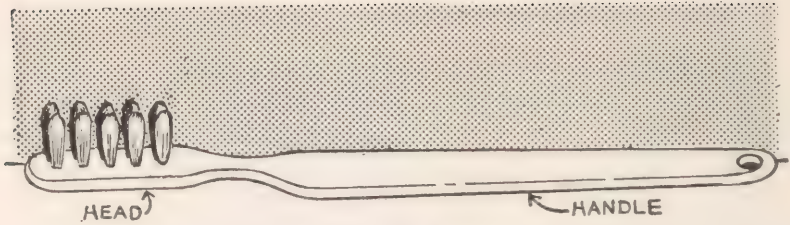


FIGURE 7

Proper type of toothbrush. NOTE short head and two rows of well-spaced bristles.

The different types of dentifrices, paste, powder, or liquid, have no particular advantage over one another. A good dentifrice should be mild and should not contain any harmful drugs. As a matter of caution the seal of the American Dental Association should be on the package. This means that the dentifrice has been tested and found to be satisfactory. A very inexpensive and practical dentifrice can be made by *dissolving one-half teaspoonful* of common table salt in a *full tumbler of lukewarm water*. Dip the brush into this solution and brush the teeth as indicated in Figures 8-15.

The teeth should be brushed at least twice a day—once after breakfast and again before going to bed.

It is important to brush the teeth after breakfast because this meal usually consists of soft, gummy foods, often sweetened, which are likely to cling to the teeth and remain in the spaces between them. Unless this food is removed it is likely to stay on the teeth throughout the day and may cause dental decay.

It is also important to brush the teeth before going to bed. During the day the lips, tongue, and cheeks, by rubbing against the teeth, may serve to clean them somewhat. The saliva also helps by washing the teeth and may remove some of the food particles. When a person is sleeping, acid-producing germs which may be present may work undisturbed on food particles. This is regarded by many authorities as one of the important causes of dental caries.

There are two objectives in using the toothbrush: (a) to clean the accessible surfaces of the teeth, and (b) to massage of the gum tissue.

Caution must be exercised in using the recommended type of brush to avoid scratching and irritating the gum tissue. This can be accomplished by placing the sides of the bristles against the gums and teeth instead of using the points of bristles. Never hold the brush at right angles to the gum.



In the upper jaw the brush is held with points of bristles facing up and the sides of the bristles resting against the gum and the teeth as illustrated in Figures 8, 9, 10, and 11.

In the lower jaw, the brush is held with the points of the bristles facing down and the sides of the bristles resting against the gum and the teeth as illustrated in Figures 12, 13, 14, and 15.



FIGURE 8

Position of toothbrush for brushing outer surfaces of upper front teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.



FIGURE 9

Position of toothbrush for brushing inner surfaces of upper front teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.

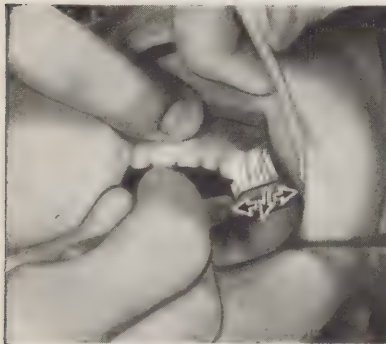


FIGURE 10

Position of toothbrush for brushing outer surfaces of upper side and back teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.



FIGURE 11

Position of toothbrush for brushing inner surfaces of upper side and back teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.

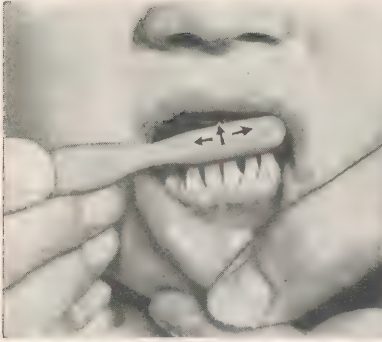


FIGURE 12

Position of toothbrush for brushing outer surfaces of lower front teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.

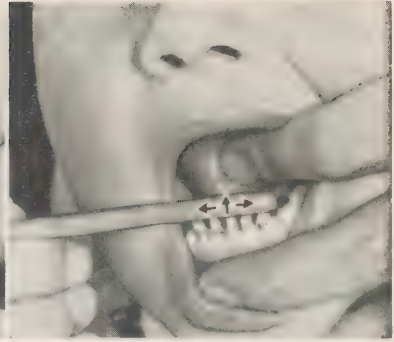


FIGURE 13

Position of toothbrush for brushing inner surfaces of lower front teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.

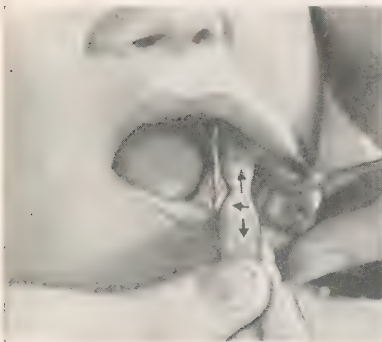


FIGURE 14

Position of toothbrush for brushing outer surfaces of lower side and back teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.



FIGURE 15

Position of toothbrush for brushing inner surfaces of lower side and back teeth. Note position of bristle points. Arrows indicate direction in which brush is moved.

Do not scrub the gums and teeth as you would scrub the floor but use the brush as you would a broom in sweeping.

In brushing the grinding surfaces of the back teeth, place points of bristles in the grooves and move brush in all directions.

## CARE OF THE TOOTHBRUSH

A toothbrush must have stiff bristles to do the best work.

Thoroughly rinse the brush in cold water. Do not use hot water because that will soften the bristles.

Hang the brush up to dry after use where the air can get to it—do not place it in a box or container. When hanging it on a rack, be sure that it does not touch any other brush.

Do not use a brush that has been used by someone else.

Brushes should be replaced when the bristles become soft. Two months is the average life of a toothbrush.

Whenever possible have two brushes in use—one for use in the morning and one for use before going to bed. This will give each brush twenty-four hours in which to dry thoroughly.

## SUMMARY

There are three important points to remember about dental health:

- 1 Proper diet and nutrition are necessary to help build sound teeth. This is especially true in the developmental years of early childhood.
- 2 Proper daily mouth care should be practiced regularly.
- 3 Regular periodic examination and care by the family dentist is of utmost importance. The proper time to begin visits to the dentist is at two and one-half or three years of age.

Because of the limited knowledge regarding the causes of dental caries it cannot be stated definitely that it is possible to prevent all dental defects. However, by following regularly the program outlined in this booklet and especially by procuring the advice of **YOUR DENTIST** concerning the proper care of **YOUR TEETH** and by permitting him to correct any dental defects before too much tooth structure is lost **YOU** will be following a sound policy of economy and will do much to preserve **YOUR TEETH** and **YOUR HEALTH**.

**BETTER DENTAL HEALTH IS A STEP  
TOWARD BETTER GENERAL HEALTH**



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